III. COMMONALITIES AND DIFFERENCES AMONG STRATEGIES

This section of the Renewables Working Group report examines the areas of commonality and differences among the various proposals that have been submitted to the Working Group. Proposal abstracts are presented in Section II, and the complete text of the proposals in Section IV. The analysis of commonalities and differences covers all of the implementation issues that have been identified by the Commission and the Working Group, and concentrates on those areas considered to be key to the development of a successful renewables program.

A. Renewables Program Implementation Proposals

There are a number of ways to separate the proposals into functional categories for purposes of comparing and contrasting them. This can be done in a hierarchical structure, as illustrated in Figure III.1. The first category used for separating the proposals into functional categories concerns whether or not the proposed program is based on the establishment of a minimum renewables purchase requirement (MRPR). The next category is based on the unit of measurement used by the proposed program, which can be either energy units (kWh) or capacity units (kW). The third category differentiates between proposals that do or do not include specified technology bands to promote targeted technologies. The fourth category addresses the issue of whether hydroelectric generating systems are included in the program. The final category concerns the issues of program enforcement, penalties, and cost control. This structure allows all six of the comprehensive program proposals to be differentiated with respect to their most significant functional differences. The adjunct proposals are also included in the figure.

A summary of the proposals and some of their distinguishing characteristics follows:

1. Comprehensive Program Proposals

a. Proposals With an MRPR Standard

AWEA/CBEA/GEA/STEA/UCS/ISWMB: Includes an MRPR, based on energy units, has one specified technology band for biomass, excludes hydro, employs a high, punitive penalty intended to motivate full compliance, and uses a credit price cap to control program costs.

IEP: Includes an MRPR, based on energy units, has one specified technology band for biomass, excludes hydro, and is predicated on voluntary compliance through green marketing by electricity providers, with a requirement for UDCs to purchase the necessary quantity of additional renewables to meet the MRPR standard, which will be enforced by PBR incentives.

NCPA: Includes an MRPR, based on capacity units, has no specified technology bands, includes hydro, and employs a penalty that applies to all kWh sold by a non-complying electric services provider intended to motivate full compliance.
SCE/PG&E: Includes an MRPR, based on energy units, has no specified technology bands, excludes hydro, provides for enforcement penalties to be set by the program administrator, and uses a credit price cap to control program costs.

SMUD: Includes an MRPR, based on energy units, has no specified technology bands, includes hydro, and does not address the issues of enforcement, penalties, or program cost.

b. Surcharge-Funded Production Credit Proposal

EDF/Cambrian/Genesis/Laidlaw/LASD/Neo/Orange&SonomaCo./Sacramento/ SDG&E/PG&E/SCE: Based on a surcharge funding approach, credits based on energy units, has no specified technology bands, excludes hydro, and provides for enforcement by the program administrator, with program cost set administratively.

2. Adjunct Proposals

The adjunct proposals received by the Renewables Working Group are limited-purpose proposals targeting emerging renewable energy technologies that are not yet fully competitive with conventional renewable generation, but which the proposers believe provide benefits in the forms of improved environmental quality and/or increased resource diversity. These proposed adjunct programs can be applied to any of the comprehensive program proposals submitted to the Renewables Working Group, and presented in this report.

BWG: Proposes to create special-purpose "greenhouse environmental credits" equal in value to a renewable energy credit for the purpose of promoting the growth of electricity generation from landfill gas and other biogas sources, technologies that assist in mitigating the effects of methane gas emissions.

CalSEIA/SEIA/ETDD/NRDC staff: Proposes to create small markets for emerging technologies, such as photovoltaics, that are progressing from the RD&D phase towards full market competitiveness with more established generating technologies.

B. Positions of the Proposals with Respect to Key Issues

The six full program proposals and two adjunct proposals to implement the CPUC's renewables policy offer a wide range of options regarding the structure and design of an effective renewable energy program. Table III.1, *Features of Proposals to Implement the CPUC Renewables Policy*, presents the major issues that should be a part of any renewables program developed by the CPUC or the California State Legislature, and summarizes the

positions of the proposals with respect to each of these issues. For the two adjunct proposals the table shows entries only for those categories that are addressed specifically by the proposals. The table illustrates the range of approaches that have been proposed to the Renewables Working Group for dealing with the key issues that have been identified by the CPUC and the Working Group. These issues are analyzed below.

1. Program Obligation Issues

a. Basis for the Obligation

The CPUC restructuring decision recommends the establishment of a minimum renewables purchase requirement (MRPR) "to meet our resource diversity goals" (p. 150, D95-12-063 as modified by D.96-01-009). The Decision further calls for the establishment of an effective enforcement mechanism in order to ensure compliance with the program. Each of the six comprehensive program proposals offers a distinct approach to creating and enforcing a renewables program in order to fulfill the CPUC's policy objectives for renewables. Five of the six proposals present strategies to implement the MRPR mechanism incorporated in the CPUC restructuring decision. The EDF et al. proposal employs an alternative approach to achieve the CPUC's policy objectives, in which a program for new renewables would be funded by a surcharge on electricity bills, with surcharge funds distributed to new renewable energy projects as production credits on the basis of a competitive bidding program. All of the MRPR-based proposals include the use of tradable renewable energy credits (RECs) to facilitate compliance and spread the costs of the program equitably across the state. Programs based on the MRPR mechanism aim to achieve a predictable quantity of renewable energy production, relying on market competition to minimize program cost. The surcharge-funded production credit approach ensures a predictable program cost, with competition for surcharge funds used to maximize the quantity of renewables generated.

All of the MRPR proposals place compliance obligations on electrical services providers. The IEP proposal imposes the obligations on the Utility Distribution Companies (UDCs) only, while the other MRPR proposals impose the obligations on all providers. Two different approaches are proposed for determining compliance obligations during each defined compliance period. Several of the proposals require obligated parties to acquire a specified quantity of RECs during each compliance period that is a percentage of their sales for that period. Since exact sales quantity during a compliance period cannot be determined in advance, these proposals provide for a true-up period following each compliance period. The NCPA proposal provides for compliance obligations to be determined on a retrospective basis, based on the obligated entities' average sales volumes during the previous twelve month period. This approach facilitates REC planning on the part of obligated parties, as they know at the beginning of each compliance period what their REC obligation will be for that period.

Each of the proposals to the Renewables Working Group for the implementation of the CPUC's renewables policy utilizes one or both of two primary tools to adjust the amount of renewable energy production associated with their proposed program:

1. A standard (the MRPR) specifying the minimum amount of renewable energy that must be produced.

2. A program cost allocation or cost cap that determines the (maximum) amount that will be spent on the support of renewable energy production within the program.

The CPUC's decision on restructuring recommends the use of an MRPR standard to achieve its objectives for renewable energy. The decision leaves open the issue of whether to impose a cost cap on the program. The IEP proposal relies entirely on the use of an MRPR standard for meeting the Commission's objectives, while the EDF et al. proposal relies entirely on the use of an administratively-determined program cost allocation. Proposals that employ both an MRPR standard and a cost cap become blends of the two approaches, with outcomes in terms of renewable energy production that can be manipulated by adjustments of either variable. If the cost cap is set at a level that is lower than the marginal price of RECs needed to fulfill a mandated MRPR, then it is unlikely that the MRPR program standard will be achieved. The challenge for the Commission and the Legislature is to balance program cost and the level of renewable energy production desired.

All of the comprehensive renewables policy implementation proposals included in this report except for the NCPA proposal are based on creating obligations for the purchase of renewable *energy*, as measured in kilowatt-hours of electricity delivered to California users. In any given period of time, the MRPR percent of defined energy must be generated from renewable generating sources, or in the case of the EDF et al. proposal, renewable energy production credits are distributed to renewable energy generators based on their energy production. Denominating a program with energy units ensures that the amount of electricity produced from renewable sources, rather than the amount of renewable generating capacity in service, is the objective of the program. This is based on a belief by proposers that renewables make their greatest contribution by their operation, not just their availability on-line. It is also straightforward to monitor a program based on energy units, since electric energy routinely is metered for purposes of sales and transfers through the grid.

The NCPA proposal is based on the creation of an obligation for an MRPR percentage of generating *capacity* from renewable sources, as measured in kilowatts. The proposal includes a requirement that suppliers of qualifying renewable capacity maintain a minimum level of energy generation that is commensurate with the generating technology in question. The NCPA proposal has the advantage that the obligation for any given period of time is based on the average monthly capacity used in the state for the previous year, and thus is determinable before each compliance period begins. Entities that are obligated to amass capacity credits know before hand how many credits they must acquire, and no true-up period is required.

The capacity-credit approach is designed to minimize the uncertainty associated with annual variations in the availability of intermittent renewable generating sources (solar, wind, and especially hydro). Intermittent generators are required to bid their capacity at a level that allows qualification with regard to required energy production in poor resource years, or face derating due to failure to perform.

The requirement in the NCPA proposal that a renewable generating source provide a minimum amount of energy on an annual basis in order to qualify as having provided its certified capacity to the system in effect minimizes the difference between an energy-based MRPR and the proposed capacity-based MRPR. For example, if the administering agency determines that a given renewable technology must operate at a load factor of 80 percent in order to qualify as having met its capacity provision obligation, then bidding a generating unit using this technology at the level of 10 MW of capacity credits is equivalent to bidding a commitment of 70,000 MWh of energy to be produced over the period of a year (10 MW x 8760 h/y x 0.8). A capacity credit program that lacks this minimum production requirement would not ensure the level of renewable energy production that the NCPA proposal, or the energy-based proposals, do.

Some participants argue that a weakness of the capacity credit approach tied to a minimum production level set differently for each renewable energy technology is that the resulting values of the credits, on a per kWh basis, would vary greatly. For example, if biomass generators were required to produce at a level of 80 percent capacity factor, and wind generators were required to produce at a level of 25 percent capacity factor, then if a capacity credit were valued at $100 per MW by the market, the biomass generator would receive a capacity value of 1.4 ¢ for each kWh produced subject to capacity credit qualification, while the wind generator would receive a value of 4.5 ¢/kWh. In other words, they argue that compared to a system based on energy credits, the capacity credit approach proposed by NCPA favors renewable generating technologies that operate at inherently lower capacity factors, and thus would secure for the market fewer kWhs of renewable energy per dollar cost of the program.

NCPA believes that the relevant issue for the state's renewable program is not the arithmetic of renewable credits, but the stream of income represented by the combination of energy sales and credit sales. The high capacity-factor renewables have more energy to sell, and thus earn more annual revenue from such sales. They also have a greater annual output of energy over which to amortize their capital costs. They will receive a lower per kWh value for their capacity credits, but the significant issue is whether the total stream of income is sufficient to induce continued operation of existing facilities, and appropriate, prudent new investment. The capacity credit approach helps to put low capacity-factor technologies in a position to compete in the market.

b. MRPRs and Program Goals

All of the proposals that are based on the MRPR approach set the initial level of the state-wide standard at a level that is based to some degree on the level of renewable energy generation in the state that existed at the time when the initial electric utility restructuring decision was made by the CPUC (April, 1994). Two of the proposals, IEP and NCPA, would set the initial MRPR at a level intended to obligate the amount of renewables that would have been achieved at the expected time of enactment of the overall restructuring program (1998) based on production that they assume would have occurred had the BRPU process been carried through to completion as originally envisioned. The SMUD proposal sets the initial level at the level of renewable energy produced in the state in 1994, while AWEA et al. sets the level at 90% of the level of renewable energy produced in the state in 1993, with the ten percent reduction adopted in an effort to ensure competition among renewables. The SCE/PG&E proposal attempts to achieve approximately the level of renewables production that the state experienced during the first half of the 1990s. Most of the MRPR proposals provide an estimate of the MRPR level that would achieve their program objectives, but state that the actual standard adopted should be based on achieving the intended goal, rather than on the actual number offered in the proposal. The exception is the SCE/PG&E proposal, which proposes to adopt the level of ten percent as the numerical standard. It would be necessary to establish a reliable data set of renewable energy use in California during the early 1990s in order to adjust the initial MRPRs to meet stated program objectives. The Renewables Working Group was unable to produce a verifiable data base that all of the participants could endorse. This is an appropriate area for future Commission inquiry.

While all of the proposals attempt to maintain state-wide levels of renewables production at levels consistent with those of the early 1990s, it is important to note that applying the proposed MRPRs uniformly to all providers, or to all regulated providers, imposes very different implications for individual providers. San Diego Gas and Electric, for example, would have to increase it renewables purchases, either directly or through the acquisition of tradable RECs, at least ten-fold to comply with the proposed MRPR standards. Only the IEP proposal provides for a transition strategy, in which initial MRPRs for each of the UDCs, which are the sole obligates in this program, are set consistent with current levels of renewables in their individual service territories.

Most of the proposals anticipate maintaining the level of the initial MRPR at a constant value for the first three years of the program, pending an expected review of the renewables program at that time. In this case the total requirement for renewables would change in proportion to changes in total energy consumption over the period (or more exactly, changes in those categories of energy consumption to which the MRPR is applied), but the renewable percentage would remain fixed. The exception to this is the AWEA et al. proposal, which includes a provision to increase the MRPR by 0.2 percent per year over the first three years of the program. It is important to note that the AWEA et al. proposal is the only one that

purposely sets the initial MRPR at a level that is below the amount of renewables produced in the state in 1993 in order to ensure competition, so that even after three years of an increasing MRPR (at 0.2%/yr), the state-wide level of the renewables program obligation will remain below the pre-restructuring level.

c. Generation Technologies Included in the Programs

California Public Utilities Code Section 701.1(a) lists as renewable generation technologies biomass (solid fuel and biogas), geothermal, solar (thermal electric and photovoltaic), and wind. Although unquestionably renewable, hydroelectric generation is not included explicitly in the list. The inclusion of new or existing hydro generation in a renewables support program is a matter of contention among the parties to the Renewables Working Group. Two of the six comprehensive program proposals, NCPA and SMUD, include hydro among the eligible technologies, while the other four comprehensive program proposals exclude hydro generation as an eligible technology for the program.
Some of the participants in the Working Group have suggested that the inclusion of hydroelectric generation in a renewables-support program presents both philosophical and practical issues. Other participants who advocate the inclusion of hydro observe that these issues are not unique to hydroelectric generation. The major philosophical issue regards the commercial and competitive status of hydroelectric generating technology. Hydro technology is fully mature and competitive with other forms of electricity generation. There is a question as to whether hydro should be given the same incentives that will be extended to the other renewables in a renewables support program. This factor is recognized by the SMUD proposal, which includes hydro as a renewable generating option for purposes of meeting the MRPR obligation, but prohibits the trading of credits associated with existing hydro generators (i.e. those commissioned before December 20, 1995). All other renewable energy credits are tradable in the SMUD program. Hydro proponents observe that biomass and geothermal technologies are also technically mature. Furthermore, operational constraints placed on hydro facilities to enhance environmental values affect their competitiveness in ways that parallel the uncertainties associated with fuel availability and price volatility for biomass and geothermal energy systems.

Some of the practical problems associated with including hydroelectric generation in a renewables support program include:

- Many hydro generators are multipurpose facilities, providing water supply, flood control, and recreational amenities in addition to power generation. Including systems of this kind in the renewables program risks subsidizing these non-energy functions. Similar considerations apply to biomass facilities, which provide ancillary waste disposal services.

- If out-of-state hydro generators are deemed eligible for the program, there is a risk that Northwest hydro sources could squeeze non-hydro renewables out of the market. To address this concern the NCPA proposal excludes out-of-state generating facilities from participation in the program, while the SMUD proposal prohibits the trading of credits associated with existing hydro facilities.

- Year-to-year fluctuations in hydro availability, which tend to be more extreme than fluctuations in other renewable energy sources, will make the timely acquisition of RECs more difficult for entities required to meet MRPR-based standards if the standard is based on energy production rather than operational capacity.

d. Competition and Diversity of Renewable Generating Sources

Renewable energy generating resources are a disparate collection of technologies that each have their own combination of characteristics and needs in order to be able to contribute to the state's electric system. For example, some renewables, such as solar electric and wind, are dominated by high capital cost, no fuel cost, and low operating cost, while others, such as biomass and geothermal, have a more conventional combination of capital and operating costs. Some of the renewables can be operated in a full or partial load-following mode, while others, notably solar electric and wind, provide intermittent power whose output profile is uncontrollable and not synchronizable to consumer demand. In addition, while all renewables may provide environmental, economic, and diversity benefits to California, the package of costs and benefits associated with each technology varies considerably.

There is an open question among members of the working group as to whether different renewables can compete successfully with each other, or whether head-to-head competition would eliminate some of the existing or emerging renewable generating sources from the system. There is also disagreement as to whether competition among the different renewables should be encouraged or discouraged from a public policy perspective. The CPUC restructuring decision asks whether it might be appropriate to impose individual technology bands in order to ensure its diversity goals for renewables.

Two of the six comprehensive program proposals, AWEA et al. and IEP, include a provision for a special band within the overall program for the support of one specific renewable technology: solid-fuel biomass. In these proposals, entities that are obligated to acquire a given quantity of renewable energy credits will be further obligated to ensure that a defined minimum fraction of the total REC obligation is contributed by biomass generating sources. The rationale contained in these proposals for a special biomass band is that biomass technologies provide an especially valuable package of environmental benefits including waste disposal services that are unique among the renewables, and biomass has difficulty competing with other renewables that inherently have much lower operating costs. Thus the

AWEA et al., and IEP proposals consider it to be a reasonable additional program cost to preserve a minimum level of biomass power generation in the state through the creation of a specified technology band for biomass.

The two adjunct proposals, BWG and CalSEIA et al., each propose an additional mechanism to be included in the renewables support program to support selected technologies. The BWG proposes a mechanism that would be geared to the mitigation of one specific environmental insult, the emission of greenhouse gases associated with the treatment and disposal of solid wastes. BWG's rationale for their proposal is that biogas power generation provides an environmental service not provided by other renewable generating sources (the additional mitigation of greenhouse gas emissions through methane emission reductions), and, in the proposers' view, it is a reasonable deal for electricity customers to pay extra to receive this particular environmental service.

The BWG proposal does not use the conventional band mechanism to promote biogas production because, it argues, banding is most effective in preserving a level of production already achieved, and in the case of the development of the state's biogas generating resources, there is a potential to increase the installed capacity several fold. Instead, the proposal creates a new category of credits called "greenhouse environmental credits" (GEC). Each kWh of electricity that is produced from biogas produces one associated REC, and one associated GEC. Each GEC has a value equal to that of a REC, providing a significant additional incentive to the production of electricity from biogas. In order to avoid out-competing other renewable energy sources with the increased credit allocation to biogas generators, it is proposed that increases in the installed capacity of biogas generators should be accompanied by a commensurate increase in the MRPR. The intent is to leave the requirement for non-biogas renewables unaffected by the level of biogas-generated power employed in the state.

The CalSEIA et al. proposal proposes a special band or surcharge that would be used to promote the commercialization of emerging renewable generating technologies that have moved beyond the R&D stage of development, but have not yet reached the point of competitiveness with the lowest-cost renewables in the market. A variety of solar technologies, such as photovoltaics and dish-Stirling engines, and other renewable technologies fit this category. CalSEIA et al. propose that temporary support of such technologies at a higher level than the expected value of the credits associated with "conventional" renewables will help these emerging technologies to move down the technology commercialization curve and become competitive with conventional renewables and other generating sources. The special band or surcharge for emerging technologies proposed by CalSEIA et al. could be added onto any of the comprehensive program proposals for the implementation of the CPUC's renewables policy included in this report.

The six comprehensive program proposals do not include provisions for the commercialization of emerging technologies, arguing that the CPUC's renewables policy is intended to be a support program for competitive renewables sources, and not a mechanism for the support of technology commercialization. On the other hand, no other mechanism currently exists to provide the type of commercialization support that is the objective of the CalSEIA et al. adjunct proposal. Since the commercialization band probably is not going to engender the level of competition that is expected within the MRPRs of the full program proposals, commercialization alternatively might be pursued via a surcharge-funded program that runs as an adjunct to whatever renewables program is adopted. One of the options proposed by CalSEIA et al., a commercialization surcharge program, would be compatible with any of the comprehensive program proposals, whether the basic program is based on an MRPR or surcharge-funded production credits. If it is added on to a surcharge -funded program, it becomes an administrative decision to determine what proportion of the total funds collected would be allocated to emerging technologies. For roof-top PV, CalSEIA et al. has also proposed that surcharge funds could be administered as part of either the R&D or energy efficiency programs.

2. Program Eligibility Issues

a. Out-of-State Renewables

Most of the comprehensive program proposals for the implementation of the CPUC's renewables policy place no restrictions on the participation in the program of renewable generating sources that are located outside of California. Most of the proposers believe that, while restricting the program to in-state renewable generating sources would be economically desirable for California, placing any such restrictions in the program would be contrary to the Commerce Clause of the U.S. Constitution, which prohibits restrictions on interstate trade. The exceptions are the AWEA et al. and NCPA proposals. The NCPA proposal takes the position that restricting participation in the program to in-state renewable generating sources would be both legal and desirable. The basis for this position is that renewable generating facilities provide unique local environmental and public health benefits that justify restricting program eligibility to local generating facilities.

The AWEA et al. proposal adopts a narrower version of this rationale. It places no restrictions on out-of-state generators in the general RECs market, but does restrict participation in the biomass BEC market to in-state biomass generators. The proposal recognizes Commerce Clause considerations, but believes that in the case of the biomass set-aside there may be a sufficient in-state interest to allow the restriction to be applied. AWEA's rationale for restricting participation in the biomass band to in-state sources is that the reason for establishing this special band in the first place is to secure for the state the waste disposal benefits of biomass power generation, such as reductions in open agricultural burning, reductions in landfilling requirements, and reductions in forest fire risks via the

removal of excess fuel from the forest. These benefits accrue to California if biomass facilities use only biomass originating in California. The Renewables Working Group is unable to provide legal guidance to the CPUC on Commerce Clause issues.

b. UDC-Owned Renewables

One renewable energy application that presents a special set of issues from the regulatory perspective is utility distribution company (UDC) owned distributed generation. Distributed generation takes the form of smaller disbursed generating facilities located at a customer, utility or other location. Distributed renewables can include photovoltaic, wind and biomass technologies. Distributed renewable generation could be owned by Utility Distribution Companies, customers or third parties, such as green direct-access providers. At a customer's premises, distributed renewables could include self-generation, third party on-site generation, or utility generation connected on either side of the meter.

Some utilities and others have proposed that utility-owned distributed generation be considered T&D plant and therefore exempt from the unbundling of generation from T&D[1]. This would permit UDCs to use distributed renewables to substitute for T&D expansion, in effect "leapfrogging" T&D congestion by moving their generating resources closer to customers. The potential of the UDC to cross-subsidize their distributed generation with savings on the T&D side is also an issue in restructuring, as is the locational market power concern related to the UDC's unique status among potential distributed generators as the owner of the distribution system.
Another potential issue is the power exchange purchase requirement of UDCs. Under restructuring, utilities are required to obtain energy through the power exchange. However, distributed generation may be unsuited to bidding into a power exchange due to transaction costs, non-dispatchability, line losses, unfeasibility of wheeling power from distribution to transmission, etc.

The AWEA et al., CalSEIA et al., and IEP proposals state that UDC-owned distributed renewables should not qualify for RECs until these issues are resolved. The AWEA et al. and CalSEIA et al. proposals would accelerate the commercialization of distributed renewables through the pass-through of T&D benefits to customers and third parties, and through the use of energy efficiency and RD&D moneys. The NCPA proposal would also make UDC-owned distributed renewables eligible for RECs. The EDF et al., and SCE/PG&E proposals state that UDC-owned distributed renewables may be eligible for subsidy by surcharge-funded production credits or RECs once CTC recovery is completed and the Commission has

[1] SDG&E, EPRI, and four utilities outside California are funding a study of legal and regulatory issues connected with this issue. All there California IOUs have conducted ratepayer-funded RD&D into integrating distributed generation into their T&D systems. The SCE/PG&E proposal suggests "RECs being awarded to distributed utility-owned renewable power" (see answer to question a.9).

resolved the functional unbundling and other issues in restructuring. The SMUD and Biogas proposals do not address the question of distributed renewables owned by UDCs.

c. Existing Renewables

The five MRPR-based proposals make existing utility-owned and QF renewable power generators eligible to participate, on a competitive basis, in a renewable credits program. The only exception to this rule is the SMUD proposal, which includes hydro in the program, but prohibits the trading of credits associated with existing hydro generating sources. The authors impose this restriction in order to limit the market power of existing hydro generating sources within the overall renewables market. The existing hydro generators are counted towards the renewables obligation of the UDC that distributes their power, but their credits are not transferable.

The EDF et al. production credit proposal excludes existing and future utility-owned renewables from participation in the surcharge program until CTC issues have been resolved and CTC amounts fully collected. Non-utility owned renewable generating sources would only be eligible to participate if their in-service date is post December 20, 1995 (the date of the CPUC restructuring decision), or if there is substantial redevelopment of a facility after that date. As such, under the EDF et al. proposal, existing QFs would not be eligible to participate in the surcharge-funded production credit program regardless of whether they continued to sell under existing power purchase contracts. As currently drafted, this program is designed to encourage the development primarily of new renewables projects.

d. Renewables Generation for On-Site, Own Use

Some of the renewable energy generated in California is used on-site by the generator[2] , rather than being sold to the utility companies for distribution and sale. Renewable self-generation occurs in two major situations: in non-grid connected applications for which the cost of grid connection would be more expensive than the cost of installing and operating an on-site renewable generating system, and in grid-connected applications for which the generator supplies his own energy requirements from a combination of the renewable generator and the grid, and supplies net or surplus renewable power to the grid. Renewable self-generation can vary in scale from a 200 W solar home system to a 50 MW biomass cogeneration system associated with a pulp and paper mill.

All of the comprehensive renewables program proposals would award RECs (or RCCs or production credits) to the quantities of surplus renewable energy generation that grid-connected self generators provide through a utility meter (eventually) to a customer. Two of the proposals, IEP and SMUD, would also award RECs for renewably generated power that

[2] For purposes of this discussion, power that is used within the renewable generating facility, commonly referred to as parasitic power, is not considered to be self-generation.

is used on-site by the generator, while the other four proposals would prohibit such power from qualifying for RECs. Those four proposers are concerrned that it may be impractical to award credits to self-generation because power consumed on-site is not officially tracked or sold through a regulated meter. Hence, the kWhs of self-generation cannot be verified. Some members of the working group believe that inclusion of self-generation in the renewables program might encourage electricity users to avoid public purpose charges and the CTC.

e. Hybrid Generators

Renewable generating technologies that incorporate heat engines in their systems are capable of operating with both renewable and non-renewable energy sources, in a hybrid generating mode. Renewables in this category include biomass, geothermal, and solar thermal electric generation. There are technical and efficiency reasons as well as economic reasons why generating facilities using these technologies choose to hybridize routinely with natural gas as an energy source, on both a spot and continuous basis. PURPA allows a renewable generating facility to obtain up to 25 percent of its energy input from non-renewable sources and maintain its qualifying status as renewable.

For purposes of qualifying for renewable energy credits, several approaches are possible for the treatment of hybrids, all of which are represented in the six comprehensive program proposals. The two basic approaches are: (a) pro rate the renewable portion of the generator's output for purposes of REC qualification, and (b) set a minimum renewable qualification for the generator and give full REC credit for complying facilities. Three of the proposals (SCE/PG&E, SMUD, and EDF et al.) would assign pro-rated credits for hybrids using any combination of renewable and non-renewable energy. The AWEA et al., IEP, NCPA, and CalSEIA proposals establish a 75 percent renewable qualification minimum, and award full renewable credits for generators that meet the minimum renewable rule. The IEP and NCPA proposals would establish a 75 percent minimum renewable qualification would assign no RECs to hybrids that do not meet the minimum qualification rule, while the AWEA et al. proposal allows pro-rated credits for such facilities.

3. Program Administration Issues

a. Program Administration

The Decision on electric utility restructuring expressed a preference for state-wide implementation of its renewable energy policy, which can be accomplished only through legislative enactment of the program. Due to jurisdictional considerations, CPUC programs only apply to the investor-owned, regulated electric utility sector. Most of the proposed comprehensive renewables programs are designated for state-wide application, although some of them allow for a two-phased implementation, beginning with the regulated electric utility

sector, and extending in the second phase to the entire electric utility industry in the state via legislative enactment. The AWEA et al. proposal provides for a two-phase implementation approach would continue the program at the CPUC level regardless of the status of state-wide legislative implementation. The SCE/PG&E and EDF et al. proposals would allow for initial CPUC implementation, but recommend canceling the program if timely legislative enactment were not achieved. The NCPA and SMUD proposals are designed for implementation at the state level only. The IEP proposal, in an effort to facilitate the implementation of the CPUC's renewables policy, is designed around enactment at the CPUC level only. State-wide application of the program would be welcomed by the IEP, but the program is designed to achieve its full program goals with CPUC implementation.

Two of the MRPR proposals, AWEA et al. and SCE/PG&E, provide for a two-phase implementation of the renewables program, but they take a different approach to how to phase-in the program. The AWEA et al. proposal would apply higher standards during initial CPUC enactment of the program, in order to achieve full program objectives in terms of state-wide renewables use within the limited context of the regulated electricity sector. Upon state-wide enactment, the standards would be adjusted to achieve the same renewables production level over the extended participant base. The SCE/PG&E proposal would set the MRPR standard at ten percent during initial enactment of the program by the CPUC, the same level that would be applied state-wide when the program is so extended.

The CPUC's electric utility restructuring program is scheduled to be implemented at the beginning of 1998, with a review of the renewable program expected to take place after the third year of the program's operation. Most of the proposals contain no sunset date, in order to create the long-term commitment that is necessary to attract investments in new renewables generating capacity. Several of the proposals point out that the programs will automatically sunset themselves if and when market conditions make renewables fully competitive with non-renewable electric generating sources. These proposals do not indicate whether they believe subsidies should continue indefinitely should renewables not be able to compete head-to-head with other generating sources in the future. Two of the proposals, SCE/PG&E and
EDF et al., suggest that during the program review following the year 2000 a specific determination be made regarding the continuation of the renewables program. The EDF et al. program proposes to award production credits through a series of five annual auctions. Successful bidders will be awarded contracts for production credits with ten-year terms, beginning with the in-service date of the auction winners.

The comprehensive program proposals present several different alternatives for the administration of a renewables program. Four of the proposals provide for the administration of the program to be carried out by an appropriate state agency, with the CEC named specifically in the NCPA proposal. The AWEA et al. proposal allows for either a state or private agency to act as administrator. The SMUD proposal calls for administration of the

program to be conducted by means of the wholesale power exchange and independent system operator, which will be created as new institutions during the first phase of the implementation of the CPUC's overall restructuring program. The IEP proposal takes a different approach, assigning administrative duties to the UDCs (utility distribution companies) that will be created as part of the restructuring process. The IEP proposal does depend on state agencies to provide certification standards and services to the renewables program. The EDF et al. proposal suggests assigning administrative duties to the California Alternative Energy and Advanced Transportation Financing Authority, but does not preclude the use of other appropriate state agencies to provide administrative services for the program.

b. Compliance and Enforcement

The CPUC restructuring decision calls for the enactment of a renewables program that is supported by effective compliance and enforcement provisions. Each of the comprehensive proposals takes a different approach to addressing this aspect of the program. The AWEA et al. proposal would impose a high, punitive penalty (6 ¢/kWh) on electricity providers that fail to acquire a sufficient quantity of RECs to meet their program obligation, with the intention of ensuring full compliance at all times. The penalty is applied to the shortfall in a provider's renewables obligation. Full compliance is further assured by setting the initial MRPR at a level that can be met with only 90 percent of the renewables production actually produced during 1993. The proposal provides cost control by including a cost cap for the RECs (2.75 ¢/kWh) and BECs (3.75 ¢/kWh). If the program administrator sells credits at the cap price, the funds collected will be used to conduct a secondary auction, purchasing credits from the market at whatever price is offered subject to the availability of funds.

The IEP proposal emphasizes voluntary compliance by non-UDC providers through direct-access green marketing, and requires the UDCs to acquire any additional renewable energy credits necessary to meet the state-wide MRPR standard, with their costs billed as a line-item charge to all UDC customers, including direct-access customers. The line-item charge will be applied in the same manner as public purpose charges or the CTC. Direct-access customers of certified "green-energy" providers will not be assessed the line-item charge. "Green-energy" certification will require providers to at least meet the MRPR standard in their portfolio of resource supply. The UDCs are responsible for administering the program, and demonstrating that the MRPR is met. Enforcement of this responsibility will be carried out as one aspect of the PBR regulatory process to which the UDCs will be subject in the restructured electricity market. No penalties are specified, and the program does not have a cost cap.

The NCPA proposal gives the CEC responsibility for administering and enforcing the renewables program. Electricity providers subject to the program are required to surrender the required number of RCCs, or face a penalty payment of 1 mill per kWh assessed to their

entire volume of power sales. The penalty acts as a cost cap for the program, and all penalty funds collected would be devoted to renewables R&D. A drawback to a penalty that is assessed to a provider's entire sales volume is that it does not provide an incentive to achieve partial compliance in cases where a provider cannot achieve full compliance at a cost that is below the cap. In such cases a provider might choose to pay the penalty in lieu of participation in the program, which could suppress the value of RCCs across the board.

The SCE/PG&E proposal includes provisions for a 2 ¢/kWh price ceiling to be applied to the shortfall of RECs that a provider is obligated to acquire, as well as possible penalties for fraudulent behavior. The ceiling price is intended by the proposers to be a fee, not a penalty, and to act as a cost cap for the renewables program. Funds collected from ceiling payments made in lieu of the acquisition of RECs could be used to reduce the CTC, or to promote the development of new renewables.

The SMUD proposal does not address the issue of penalties and enforcement in their proposal.

The EDF et al. proposal is based on a surcharge-funded program rather than the establishment of an MRPR, so enforcement requirements for the program are different than for the MRPR-based proposals. The program is based on the use of an administratively-determined cost to be used to fund renewable technologies. The proposers do not recommend a specific overall funding level, but do use as an example a program funding level of $125 million, assuming the program is enacted on a state-wide basis. Compliance incentives or penalties are not expected to be necessary for this type of program. The program funds would be administered by a state agency.

The CalSEIA et al. proposal does not specifically address penalties for non-compliance, but it does propose a cost cap on the price of credits for the emerging technologies band. The cap would not be a fixed price, but rather would be set at some specified multiplier above general REC trading prices. If market price reached the cap, it would trigger the program administrator to sell credits at the cap price and use the proceeds to fund increased renewables generation.

c. Renewable Credits and Credit Markets

The CPUC's restructuring decision proposes a renewables program based on an MRPR that is intended to be applied state-wide to all electricity sales to end users. In order to facilitate compliance and minimize program cost, the decision envisions the creation of a market for the trading of renewable energy credits, allowing electricity providers in the state that are deficient in renewable generating resources to fulfill their obligation by purchasing credits that are available from renewable energy used anywhere in the state. Renewable energy generators benefit by having two commodities to sell, renewable energy and its associated RECs. In

addition, the purchasers of renewable energy may benefit from the resale of RECs to retail sellers that require additional credits to meet their MRPR requirement. The value of the RECs is intended to provide the above-market increment that renewables generators need in order to be able to compete in the restructured market. The value of the RECs will be controlled by market competition, assuming that a competitive market is engendered by the program. The five MRPR-based proposals offer several alternatives for the structuring of a competitive REC market.

Most of the proposals are non-specific with respect to the structure or mechanism of the market that would be created for the trading of RECs. The proposals would allow a variety of transfer mechanisms to develop, including bilateral contracts, packaged energy and REC sales contracts, long-term contracts, and spot sales. In most proposals, providers of energy to California end users are obligated to acquire a minimum quantity of RECs sufficient to satisfy their MRPR obligation. These RECs are to be surrendered to the designated administrator at the end of each compliance period.

The SMUD proposal offers a different approach to the operation of a REC market, taking advantage of the creation of the wholesale power exchange and independent system operator (ISO) as part of the restructuring process. The power exchange will purchase all power to be grid-distributed in the state as restructuring is implemented, and will be responsible for the acquisition of power at lowest cost. The ISO will be responsible for ensuring that system integrity and reliability standards are maintained. SMUD's proposal suggests that it would be a natural extension to have the exchange also be responsible for acquiring the necessary quantity of RECs, with the cost distributed proportionally to electric service providers as they take power from the exchange for distribution to California end users. The exchange would be given the same latitude to balance firm and spot REC purchases as it has for energy purchases. SMUD contends that this system would avoid the market power problem that could arise in a market operating with a limited number of purchasers of RECs.

d. RECs from Energy Sold Under Existing PPAs

All of the MRPR proposals agree that the generator of a REC may sell that REC, just as he sells his output of kWhs. In situations where renewable energy is being sold under long-term power-purchase agreements (PPA) that pre-date market restructuring, however, the assignment of RECs is far from clear. Since the RECs did not exist at the time the PPAs were formulated, there is no specification regarding REC transfer in these contracts. This is an issue of considerable significance for the implementation of an MRPR program, as much of the renewable generating capacity that will be available during the enactment of the program will be bound by existing, long-term PPAs, some of which extend more than twenty years beyond the planned restructuring implementation date.
The proposals (AWEA et al., IEP, SCE et al., SMUD) that offer a directed solution to the issue of assignment of RECs for renewable energy sold under pre-restructuring PPAs agree

that in cases where renewable energy is being sold under the fixed-price schedules included in standard-offer PPAs (specifically interim Standard Offer #4 PPAs with the appropriate selections made), the RECs associated with this energy would be considered to be packaged with the energy, and the property of the purchaser (i.e., the utility).

There is considerable disagreement, however, regarding the assignment of RECs associated with energy that is being sold under pre-restructuring long-term PPAs, when energy is sold at the short-run avoided cost (SRAC) rate, and capacity is sold at long-term levelized contract rates. The AWEA et al. and IEP proposals assign all RECs associated with energy sold at SRAC to the generator. This means that the generator would receive the benefits of the newly-created RECs, which were not anticipated during the negotiation of the original PPAs. The SCE/PG&E, and SMUD proposals assign all RECs sold under pre-restructuring long-term PPAs to the purchaser on behalf of ratepayers.

One of the reasons that a renewables support program is being considered by the CPUC is an expectation that renewable power generators will have trouble competing in a competitive electricity market. The purpose of the creation of a RECs market and REC procurement requirements for electric services providers is to provide the necessary increment of value (above market) that is necessary to allow renewables generators to produce renewable power in the restructured market. The economic viability of renewable generators operating under existing PPAs, with energy sold under SRAC and long-term capacity sales, in the restructured market is questionable. Assuming that SRAC represents full market value in the restructured market, as it is intended to do, then facilities receiving SRAC plus capacity payments will be above market by the value of the capacity payments. How the value of capacity payments will compare with the value of the newly created RECs is difficult to predict.

The NCPA proposal addresses the issue of the assignment of RECs (in their case, RCCs) associated with renewable power sold under pre-restructuring PPAs by directing the parties to the contracts to negotiate the disposition of the soon-to-be created RECs. The existing PPAs are legally binding contracts, and any changes to them will have to meet the requirements of contract law. The CPUC has posed as an important implementation issue the question of whether restructuring efforts will or will not produce incentives to re-negotiate existing contracts. The issue of assignment of RECs under existing PPAs is one area where this issue must be considered carefully.

e. Competition and Marketing of RECs

The overall restructuring of the electricity market is predicated on the goal of making the market more competitive. The CPUC's renewables policy, too, is intended to be subject to the rigors of market competition. Such competition can take a variety of forms. The broadest possible competition, which should lead to the lowest possible program cost (or maximum renewables production under the production credit program), would allow all

renewables to compete together, both among different technologies, and between existing and new generating installations. Competition among different renewables technologies has been discussed previously under heading A.1.d. *Maintaining Renewables Diversity*.

The restructuring decision's policy goals for renewables include both maintaining the resource diversity for existing resources, and encouraging the development of new renewables. The development of new renewable generating sources may be difficult unless long-term contracts for sales of renewable energy and RECs can be obtained by developers hoping to secure funding for their projects. Most of the MRPR proposals leave the development of REC contracts to the market. No special provisions are included to facilitate the development of contracts tailored to the specific needs of new generating sources. The EDF et al. production credit proposal, in contrast, is for a program that would be tailored to the development of new renewables, offering winning bidders ten-year commitments for the payment of production credits, and barring existing facilities from participating in the bidding program. IEP suggests enacting incentives to facilitate the development of new renewable generating sources. These include developing a Renewable Trademark easily recognized by consumers, offering a CTC credit option in which direct access customers entering into contracts with renewable QFs would be eligible for a credit of all or a portion of the CTC, and implementing a renewable energy purchase requirement for state facilities.

The CPUC restructuring decision relies on the creation of an enforceable standard to achieve its policy goals for renewables. The decision does not address the issue of green marketing directly. The Renewables Working Group, however, has asked each of the proposers to address the issue of how green marketing might fit into the context of their proposals. The IEP proposal is designed around the concept of using green power marketing to achieve the bulk of the compliance that would be necessitated by the MRPR standard included as part of their proposal. Direct access providers will be able to qualify for "green" certification based on the acquisition of sufficient RECs, which they will then be able to market as a desirable attribute of the service they offer to their customers. A rating system based on renewable content could be developed in order to provide consumers with a range of alternative "green" electrical services packages and prices.

Green marketing of power is not a major ingredient of any of the other renewable program proposals, although two of the proposals, AWEA et al. and SCE/PG&E, discuss a mechanism by which green marketing techniques could be used to increase the total generation of renewable energy. In each of these proposals, each electric services provider in the state is obligated to acquire RECs representing the MRPR fraction of its energy supply. Green marketing could be used by environmental organizations, for example, to competitively purchase and remove RECs from the system, increasing the total quantity of renewable energy generated to a level that is greater than that necessary to fulfill the state's collective mandated program obligation. "Green" direct-access providers who purchase some multiplier

greater than the MRPR standard of RECs for their portfolio of sources would have the same effect on the collective state market.

C. Areas of Commonality and Difference Among the Proposals

Early in the process, the Renewables Working Group participants realized that it would be unrealistic to set as a goal the reaching of consensus on all or most of the major issues being raised within the group in the timeframe envisioned. The group recognized that there was a wide diversity of interests among the participating parties, and disagreement over the issue of the appropriate methodology that should be used in implementing a program to support renewable energy projects in California. The Renewables Working Group decided to focus its efforts on developing a report that would present a number of comprehensive proposals for the implementation of the CPUC's renewables policy, and discuss the many issues needing to be resolved.

While there is no unanimity of opinion on any of the major issues considered by the Working Group, there are some important areas of broad consensus, as well as areas of general disagreement, which are highlighted below.

The Renewables Working Group reached consensus in the following areas:

- Any renewables support program enacted in the state should rely, to the maximum extent possible, on market competition to minimize program cost and/or maximize program performance. Incentives that encourage renewables to participate in the competitive market to the fullest extent possible should be developed. The program should be designed with maximum flexibility in order to facilitate compliance.

- It would be preferable for any renewables support program enacted in the state to be implemented on a statewide, non-bypassable basis. However, there is disagreement among the parties as to whether that can be accomplished within the timeframe envisioned by the Commission for the initiation of electric utility restructuring.

- In order to be eligible for participation in the program, energy produced by renewable generating sources must be used by consumers located in California. However, there is disagreement among the parties as to whether renewable generating sources located outside of California should be allowed to participate in the program (or whether out-of-state sources can be denied the right to participate).

- All of the proposals to the Working Group place compliance obligations on electrical services providers to meet the program's requirements. None of the proposed programs place compliance obligations on electricity generators.

- Ratepayers should be given credits accruing to renewable generating sources currently owned by the utilities.

- All of the renewable generating technologies listed explicitly in the California Public Utilities Code, including biomass, geothermal, solar, and wind, should be eligible for participation in a renewables support program. However, there is disagreement as to whether hydroelectric generators should be eligible to participate.

- Regardless of the type of renewables support program adopted, provisions should be included in the program to counter fraudulent activity on the part of any program participant.

- It would be desirable to coordinate with the RD&D Working Group regarding funding and other issues relating to the commercialization of emerging renewable generating technologies.

The Renewables Working Group was not able to reach consensus in the following areas:

- The basic methodology upon which to base a renewables support program. There was a clear split within the group over whether to base the program on a minimum renewables purchase requirement, or whether to base the program on a surcharge funding mechanism. The group was also split over whether to denominate renewable credits using energy (kWh) or capacity (kW) units.

- Whether the program should have a cost cap, at what level should a cost cap be set, and what should be done with any funds that are collected as a result of administrative sales of credits, should the cost cap be reached.

- Whether the program should focus on the development of new renewable generating sources, or whether it should be used to support both existing and new renewable generating sources. If existing generating resources are eligible to participate in the program, there is disagreement over how to allocate credits for renewable energy that is sold under existing (pre-restructuring) power purchase agreements.

- Whether specific technologies should be targeted for support, or whether all renewables eligible to participate in the program should compete head-to-head. The only technologies for which special consideration is requested are solid-fuel biomass, biogas, and emerging technologies. Some proposals would give special consideration to one or more of these technologies, whereas others propose full head-to-head competition among all eligible renewable generating technologies. In the case of emerging technologies, the

group was split over what role a renewables program should play in support of commercialization, or whether commercialization is more appropriately dealt with through the RD&D program, or a combination of both.

- What types of renewable energy applications should be eligible for participation in the program? The proposals offer a variety of approaches for applications such as UDC-owned distributed generating sources, hybrid generators, and self-generation.

- Can the CPUC implement a renewables program based upon existing state law, and/or within the context of electric utility restructuring, or is new legislation required?

- What is the most appropriate agency to administer the program, and what type of market structure should be used in the trading and acquisition of renewable energy credits?